

## AMENDMENTS TO THE CLAIMS

1-14 (Cancelled)

15. (Currently Amended) A multi-service monitoring system comprising:

computer server systems having a cluster of application servers communicatively

coupled on a computer network to serve software applications over the computer network to a plurality of computer client systems, wherein each computer server system including an application server having:

an administration service to generate runtime management beans ("MBeans"),

wherein each runtime MBean is associated with one or more resources such that each runtime MBean serves as an intermediary between its one or more associated resources and a corresponding monitor MBean of monitor MBeans that seeks monitoring data relating to the one or more resources, each runtime MBean collecting monitoring data relating to the one or more associated resources and reporting the monitoring data to the corresponding monitor MBean, wherein each monitor MBean to actively receive the monitoring data from a corresponding runtime MBean via active instrumentation, wherein the active instrumentation is performed upon occurrence of a specified event associated with the one or more resources; and

a monitor service in communication with the administration service, the monitor service to generate the monitor MBeans, each monitor MBean being directly mapped to a corresponding runtime MBean and indirectly mapped to a resource associated with the corresponding runtime MBean, and each monitor MBean having a resource identifier to identify its corresponding runtime MBean.

16. (Previously presented) The system as in claim 15 wherein each computer server system including an application server further having:  
a notification service to generate notifications in response to occurrence of one or more specified events relating to one or more runtime MBeans or one or more monitor MBeans, the notification service providing the notifications to each application server in the cluster of application servers.
17. (Cancelled)
18. (Previously presented) The system as in claim 15 wherein each computer server system including an application server further having:  
a graphical user interface to hierarchically display the monitoring data associated with resources associated with server nodes based on a hierarchical arrangement of the server nodes in a hierarchical tree structure.
19. (Cancelled)
20. (Currently Amended) The system as in claim 15 wherein the runtime MBeans include standard runtime MBeans and specific runtime MBeans, the standard runtime MBeans providing one or more predefined standard functions for their associated resources, and the specific MBeans providing one or more resource-specific functions for their associated resources, wherein the standard functions include starting and stopping of a resource, and wherein the specified events include a resource reaching a first threshold value indicating the resource is available, and reaching a second threshold value representing a critical resource value indicating the resource is not available.

Claims 21-29 (Cancelled)

30. (Currently Amended) A method comprising:  
communicatively coupling a cluster of application servers on a network to serve

software applications over the network to a plurality of clients;  
generating runtime management beans ("MBeans"), wherein each runtime MBean  
is associated with one or more resources such that each runtime MBean  
serves as an intermediary between its one or more associated resources  
and a corresponding monitor MBean of monitor MBeans that seeks  
monitoring data relating to the one or more resources, each runtime  
MBean collecting monitoring data relating to the one or more associated  
resources and reporting the monitoring data to the corresponding monitor  
MBean, wherein each monitor MBean to actively receive the monitoring  
data from a corresponding runtime MBean via active instrumentation,  
wherein the active instrumentation is performed upon occurrence of a  
specified event associated with the one or more resources; and  
generating the monitor MBeans, each monitor MBean being directly mapped to a  
corresponding runtime MBean and indirectly mapped to a resource  
associated with the corresponding runtime MBean, and each monitor  
MBean having a resource identifier to identify its corresponding runtime  
MBean.

31. (Previously presented) The method as in claim 30 further comprising:  
generating notifications in response to occurrence of one or more specified events  
relating to one or more runtime MBeans or one or more monitor MBeans,  
the notification service providing the notifications to each application  
server of the cluster of application servers.
32. (Cancelled)
33. (Previously presented) The method as in claim 30 further comprising:

- hierarchically displaying, via a graphical user interface, the monitoring data associated with resources associated with server nodes based on a hierarchical arrangement of the server nodes in a hierarchical tree structure.
34. (Cancelled)
35. (Previously presented) The method as in claim 30 wherein the runtime MBeans include standard runtime MBeans and specific runtime MBeans, the standard runtime MBeans providing one or more predefined standard functions for their associated resources, and the specific MBeans providing one or more resource-specific functions for their associated resources.
36. (Currently Amended) A tangible machine-readable storage medium comprising instructions which, when executed, cause a machine to:
- communicatively couple a cluster of application servers on a network to serve software applications over the network to a plurality of clients, each of the application servers comprising server nodes;
- generate runtime management beans ("MBeans"), wherein each runtime MBean is associated with one or more resources such that each runtime MBean serves as an intermediary between its one or more associated resources and a corresponding monitor MBean of monitor MBeans that seeks monitoring data relating to the one or more resources, each runtime MBean collecting monitoring data relating to the one or more associated resources and reporting the monitoring data to the corresponding monitor MBean, wherein each monitor MBean to actively receive the monitoring data from a corresponding runtime MBean via active instrumentation, wherein the active instrumentation is performed upon occurrence of a

specified event associated with the one or more resources; and  
generate the monitor MBeans, each monitor MBean being directly mapped to a  
corresponding runtime MBean and indirectly mapped to a resource  
associated with the corresponding runtime MBean, and each monitor  
MBean having a resource identifier to identify its corresponding runtime  
MBean.

37. (Previously presented) The tangible machine-readable storage medium as in claim 36 wherein the instructions which, when executed, further cause the machine to: generate notifications in response to occurrence of one or more specified events relating to one or more runtime MBeans or one or more monitor MBeans, the notification service providing the notifications to each application server of the cluster of application servers.
38. (Cancelled)
39. (Previously presented) The tangible machine-readable storage medium as in claim 36 wherein the instructions which, when executed, further cause the machine to: hierarchically display, via a graphical user interface, the monitoring data associated with resources associated with server nodes based on a hierarchical arrangement of the server nodes in a hierarchical tree structure.
40. (Cancelled)
41. (Previously presented) The tangible machine-readable storage medium as in claim 36 wherein the runtime MBeans include standard runtime MBeans and specific runtime MBeans, the standard runtime MBeans providing one or more predefined standard functions for their associated resources, and the specific MBeans providing one or more resource-specific functions for their associated resources.

- 42. (Cancelled)
- 43. (Cancelled)
- 44. (Previously presented) The method as in claim 30, further comprising passively reporting the monitoring data from the runtime MBeans, at an instrumentation level, to the monitor MBeans, at an agent level, according to a predetermined schedule.
- 45. (Previously presented) The method as in claim 44, further comprising actively reporting the monitoring data from the runtime MBeans to the monitor MBeans at an occurrence of an event or in response to a request from a monitor MBean.
- 46. (Cancelled)
- 47. (Cancelled)
- 48. (Previously presented) The system as in claim 15, wherein the one or more resources comprise one or more system resources including one or more of kernel resources, application components, and libraries.
- 49. (Cancelled)
- 50. (Cancelled)
- 51. (New) The system as in claim 15, wherein the monitor MBeans is further to passively receive the monitoring data from the runtime MBeans via passive instrumentation, the passive instrumentation including runtime MBeans automatically providing the monitoring data to the monitor MBeans.
- 52. (New) The system as in claim 16, wherein the notification service includes one or more of a notification broadcaster to facilitate generation of the notifications, a notification listener to facilitate reception of the notifications, and a notification filter to filter the notifications on behalf of the notification listener.

53. (New) The system as in claim 15, wherein the monitoring data comprises monitor updates including one or more of a string monitor to monitor text as string values, an integer monitor to monitor an integer value, a table monitor to monitor a table containing a header and a contents, a state monitor to assign colors to the string values, an availability monitor to monitor a Boolean value indicating whether a resource is available, a frequency monitor to compute a frequency according to reported number of events given at specified times, a quality rate monitor to compute an average quality rate or an actual quality rate according to a reported number of total tries and successful tries, a pool monitor to monitor a pool characterized by configurable values or runtime values, and a cache monitor to monitor a cache characterized by a configurable maximum cache size or a number of current used objects.
54. (New) The method as in claim 30, wherein the monitor MBeans is further to passively receive the monitoring data from the runtime MBeans via passive instrumentation, the passive instrumentation including runtime MBeans automatically providing the monitoring data to the monitor MBeans.
55. (New) The method as in claim 31, wherein the notification service includes one or more of a notification broadcaster to facilitate generation of the notifications, a notification listener to facilitate reception of the notifications, and a notification filter to filter the notifications on behalf of the notification listener.
56. (New) The method as in claim 30, wherein the monitoring data comprises monitor updates including one or more of a string monitor to monitor text as string values, an integer monitor to monitor an integer value, a table monitor to monitor a table containing a header and a contents, a state monitor to assign colors to the string values, an availability monitor to monitor a Boolean value indicating whether a

- resource is available, a frequency monitor to compute a frequency according to reported number of events given at specified times, a quality rate monitor to compute an average quality rate or an actual quality rate according to a reported number of total tries and successful tries, a pool monitor to monitor a pool characterized by configurable values or runtime values, and a cache monitor to monitor a cache characterized by a configurable maximum cache size or a number of current used objects.
57. (New) The tangible machine-readable storage medium as in claim 36, wherein the monitor MBeans is further to passively receive the monitoring data from the runtime MBeans via passive instrumentation, the passive instrumentation including runtime MBeans automatically providing the monitoring data to the monitor MBeans.
58. (New) The tangible machine-readable storage medium as in claim 37, wherein the notification service includes one or more of a notification broadcaster to facilitate generation of the notifications, a notification listener to facilitate reception of the notifications, and a notification filter to filter the notifications on behalf of the notification listener.
59. (New) The tangible machine-readable storage medium as in claim 36, wherein the monitoring data comprises monitor updates including one or more of a string monitor to monitor text as string values, an integer monitor to monitor an integer value, a table monitor to monitor a table containing a header and a contents, a state monitor to assign colors to the string values, an availability monitor to monitor a Boolean value indicating whether a resource is available, a frequency monitor to compute a frequency according to reported number of events given at specified times, a quality rate monitor to compute an average quality rate or an

actual quality rate according to a reported number of total tries and successful tries, a pool monitor to monitor a pool characterized by configurable values or runtime values, and a cache monitor to monitor a cache characterized by a configurable maximum cache size or a number of current used objects.